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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/695,415

10/29/2003

Hidenori Kawanishi

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MCLEAN, VA 22102

EXAMINER

VAN ROY, TOD THOMAS

ART UNIT

PAPER NUMBER

2828

MAIL DATE

DELIVERY MODE

09/03/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/695,415

Applicant(s)

KAWANISHI ET AL.

Examiner

TOD T. VAN ROY

Art Unit

2828

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 16 June 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-30 and 33-41 is/are pending in the application.
- 4a) Of the above claim(s) 2-9, 12-19, 22 and 23 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 10, 11, 21, 24-30 and 33-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 06/18/2008
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 06/16/2008 has been entered.

Response to Amendment

The Examiner acknowledges the amending of claims 1, 11, 21, 24, 33-35, 37-38, and the addition of claim 41, and cancellation of claims 31-32.

Response to Arguments

Applicant's arguments filed 06/16/2008 have been fully considered but they are not persuasive.

The Applicant has argued that neither Fukunaga nor Yoshida teach both the active layer and upper guide layer to be doped of the same conductivity type.

The Examiner does not dispute this point. Fukunaga is used to teach the overall device structure including doping of the upper and lower guide layers as well as an undoped active region. Yoshida is then presented which teaches a doped active region used to reduce device resistance. Fukunaga need not teach the doping of both layer types as this is the reason Yoshida is used in combination. Likewise, Yoshida need not

teach the doping of both layer types as he is used to motivate the doping of only the active region. The Applicant's argument is therefor moot.

The Applicant has argued that there is no evidence that Fukunaga's device suffers from high resistance.

The Examiner is of the belief that Fukunaga need not teach a resistance level. The combination of Yoshida is valid as the teaching of doping an active region is given clear motivation. This would make the combination obvious to try to one of ordinary skill in the art in order to achieve the possible reduced resistance benefit.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 41 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

Claim 41 describes the quantum well active layer being doped with 2 different conductivity types which is not found in the disclosure.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 10, 11, 21, and 24-30, 33-40 rejected under 35 U.S.C. 103(a) as being unpatentable over Fukunaga (2002/0044584) in view of Yoshida et al. (US 2002/0041613).

With respect to claim 1, Fukunaga teaches a semiconductor laser device comprising: a first conductivity (n) semiconductor substrate (fig.3 #51, [0055], n); a first conductivity lower clad layer deposited on the first conductivity substrate (fig.3 #52, [0055], n); a lower guide layer deposited on the first conductivity lower clad layer (fig.3 #53, [0055], n, AlGaAs); a quantum well active layer deposited on the lower guide layer (fig.3 #55); an upper guide layer deposited on the quantum well active layer (fig.3 #63, [0058], p, AlGaAs); a second conductivity (p) upper clad layer deposited on the upper guide layer (fig.3 #64, [0058], p); wherein the upper guide layer and the lower guide

layer are made of an AlGaAs based material ([0055, 0058]), wherein the quantum well active layer comprises at least two barrier layers and at least one well layer, and the barrier layers and the well layers are alternatively stacked such that a top layer and a bottom layer of the quantum well active layer are barrier layers ([0055], fig.3 #54/55/56), and wherein the active layer is made of a non-Al based material (InGaAsP). Fukunaga does not teach the active layer to be doped a second (p) conductivity. Yoshida teaches a semiconductor laser device having an InGaAsP active region [0047] wherein the active region is taught to be p doped ([0035], Zn, [0034] $1\text{E}17\text{cm}^{-3}$). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser and InGaAsP active material of Fukunaga with the doped InGaAsP active material of Yoshida in order to reduce the series resistance and thermal impedance of the laser device (Yoshida, [0033]).

With respect to claim 11, Fukunaga teaches the device outlined in the rejection to claim 1 above, but does not teach the active layer to be doped with a first conductivity impurity. Yoshida teaches a semiconductor laser device having an InGaAsP active region [0047] wherein the active region is taught to be n doped ([0034], Si, [0034] $1\text{E}17\text{cm}^{-3}$). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the laser and InGaAsP active material of Fukunaga with the doped InGaAsP active material of Yoshida in order to reduce the series resistance and thermal impedance of the laser device (Yoshida, [0033]).

With respect to claims 10 and 20, Fukunaga and Yoshida teach the laser device outlined in claim 1, but do not teach the use of the laser device as the source in an

optical disk unit. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the laser device of Fukunaga and Yoshida in an optical disc unit as outputted wavelength regime is well known for use in optical disc technologies.

A reference noted, but not relied upon for this rejection is Shiimoto et al. (US 6456635) that speaks of this wavelength regime being useful for optical discs (col. 1 lines 20-54).

Claims 21, 27-29, and 39 are rejected for the same reasons given above for the rejection of claim 1, as these claims describe the manufacturing of the given semiconductor layers. Reference is made to [0055] of Fukunaga, which teaches the given layers to be "formed".

Claims 24-26, 30, and 40 are rejected for the same reasons given above for the rejection of claim 11, as these claims describe the manufacturing of the given semiconductor layers. Reference is made to [0055] of Fukunaga, which teaches the given layers to be "formed".

With respect to claims 33-34, Fukunaga and Yoshida in claim 1 teach the second conductivity to be p (active and upper guide) and the active region to be doped with Zn at $1E17\text{cm}^{-3}$. Fukunaga and Yoshida do not teach the upper guide to be doped with Zn specifically. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the same p dopant in all of the p type layers as a matter of design choice which would save production time and money.

With respect to claims 35-36, Fukunaga and Yoshida in claim 11 teach the first conductivity to be n (active and lower guide) and the active region to be doped with Si at $1 \times 10^{17} \text{ cm}^{-3}$. Fukunaga and Yoshida do not teach the lower guide to be doped with Si specifically. It would have been obvious to one of ordinary skill in the art at the time of the invention to use the same n dopant in all of the n type layers as a matter of design choice which would save production time and money.

With respect to claims 37-38, Fukunaga further teaches the upper and lower AlGaAs waveguides to be of a 0.2 Al ratio ([0055]). Fukunaga does not teach the value to be larger than 0.2. It would have been obvious to one of ordinary skill in the art at the time of the invention to adjust to a ratio slightly larger than 0.2 as a matter of optimization of the known values. (see MPEP 2144.05 II A).

Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukunaga, Yoshida and further in view of Takano et al. (JP-3-73586, Applicant submitted prior art).

With respect to claim 41, Fukunaga further teaches the lower guide layer is doped with a first conductivity type (see claim 1), but do not teach the active layer to be additionally doped with the first type. Takano teaches an active layer doped with both types of conductivity dopants (abs.). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the device of Fukunaga and Yoshida with the additional doping of Takano in order to shorten carrier lifetimes (Takano, abs.).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TOD T. VAN ROY whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TVR/

/Minsun Harvey/

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Supervisory Patent Examiner, Art Unit 2828